

REMARKS/ARGUMENTS

The applicants' attorneys thank Examiner Parvini and Examiner Lorengo for the in-person interview conducted on May 20, 2010 at the United States Patent and Trademark Office.

Claim 1 has been amended to include the limitations of claim 4. Claim 4 has been canceled.

Furthermore, a declaration by Dr. Henglein is submitted to support the position that having an aluminum oxide-containing layer or an aluminum oxide/hydroxide-containing layer that is at least 50nm thick has been found by the inventor, Dr. Henglein, to be necessary to avoid a potentially unsafe exothermic reaction.

The declaration is necessary in that it shows that conventional knowledge taught away from coating an aluminum pigment with a thick enough metal chalcogenide layer that can produce color flop as set forth in claim 1, and that an aluminum oxide-containing layer or an aluminum oxide/hydroxide-containing layer having a thickness of at least 50nm suppresses a potentially unsafe exothermic reaction.

The declaration was not submitted earlier because the importance of the evidence set forth in the declaration was not known until the after-final interview of May 20, 2010. Entry and consideration of the declaration is requested.

Claim 1 calls for an aluminum oxide-containing layer or an aluminum oxide/hydroxide-containing layer that is 50-300nm thick, which is coated with a metal chalcogenide layer. Together, the two layers exhibit a soft-color flop having a $\Delta H^*_{\text{anchor}}$ in a range of between 1.5 and 50.

Dr. Henglein, in his declaration, states that to "avoid the potentially dangerous exothermic reaction caused by direct contact between a metal chalcogenide coating and the aluminum core of an ordinary aluminum pigment, it was known to coat such pigments with a metal chalcogenide (e.g. iron oxide) such that the stoichiometric ratio of the metal chalcogenide to the aluminum surface of the pigment was kept very low. Consequently, only a very thin layer of iron oxide was realized over an ordinary aluminum pigment. Such a thin iron oxide layer is not capable of generating interference to produce flop or the like optical behavior normally associated with effect pigments". Declaration of Dr. Henglein, page 2, paragraph 9.

Furthermore, Dr. Henglein states that he has "found that an aluminum pigment or an aluminum alloy pigment can be safely coated with a thick metal chalcogenide layer (thick enough to produce a color flop as set forth in claim 1) if the underlying aluminum oxide or aluminum hydroxide is a certain minimum thickness". Declaration of Dr. Henglein, page 3, paragraph 12.

In addition, Dr. Henglein states that he has, through experimentation, found that the aluminum oxide-containing layer or the aluminum oxide/hydroxide-containing layer needs to be at least 50nm in order to safely obtain a thick enough metal chalcogenide layer that is capable of producing the color flop set forth in claim 1.

From experimental data I have concluded that the aluminum oxide layer must be at least 50 nm thick in order to allow for safely coating the aluminum pigment with a thick layer of metal chalcogenide (thick enough to produce color flop as set forth in claim 1). Thus, I have found that an aluminum oxide-containing layer or an aluminum oxide/hydroxide-containing layer that is at least 50 nm thick acts as a seal to prevent contact between the metal oxide coating and the surface of the aluminum pigment to suppress the exothermic reaction, which had previously led others away from coating an aluminum pigment with a thick metal chalcogenide layer. Declaration of Dr. Henglein, page 3, paragraph 13.

Dr. Henglein's declaration, therefore, establishes that coating an aluminum-based substrate, such as the one shown by Reisser, with a thick enough metal chalcogenide to produce any color flop at all was thought to be unsafe, and that he has found that an aluminum oxide-containing layer or an aluminum oxide/hydroxide-containing layer of a proper thickness (specifically at least 50nm) allows for a safe coating of an aluminum-based substrate such as the one disclose by Reisser with a thick metal chalcogenide layer.

It is respectfully submitted, therefore, that claim 1 should not be deemed obvious over the disclosure of Reisser and other cited references as set forth in the Office Action.

THIS CORRESPONDENCE IS BEING
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Respectfully submitted,



Kourosh Salehi
Registration No.: 43,898
OSTROLENK FABER LLP
1180 Avenue of the Americas
New York, New York 10036-8403
Telephone: (212) 382-0700

RCF:KS/jl